2012
Annual Report

European Copper Institute

Our vision

Inspiring Europe about copper's essentiality for health, technology and quality of life.

Our mission

The European Copper Institute (ECI), founded in 1996 in the UK and based in Brussels since 1998, is a joint venture between the International Copper Association – representing the majority of the world's leading mining companies, custom smelters and semi-fabricators – and the European copper industry. Operating with an annual budget of around €13 million, our experts work in teams to provide high-quality services to our member companies, to respond to requests from regulators, academia and media, and to support copper users across a broad range of end-use sectors.

Throughout 2012, ECI and its network of eleven national associations continued activities across Europe to promote and publicise the many benefits of copper to society. Pages 10 to 21 describe how copper-based solutions are helping to address today's social, economic and environmental challenges in key markets, including energy and electricity, building construction and healthcare.

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CHAIRMAN'S MESSAGE

2012 was a difficult year for the European copper industry. Due to a combination of Government austerity programs, stricter borrowing conditions for consumers and low activity levels, particularly in most national construction markets, the International Copper Study Group[1] expects EU27 refined copper usage to be 3.1 million tonnes, 7% below the 2011 total. Globally, refined demand is expected to be around 20.7 million tonnes, up 4% on 2011.

Stefan Boel
Member of the Executive Board
Aurubis AG

Significant investments by the mining industry have boosted global supply capability. In 2012, global refined production is expected to increase 2% above 2011, resulting in year-end metal exchange inventories building slightly to around 600 thousand tonnes. Metal prices traded within a relatively narrow band throughout the year, with the average 2012 London Metal Exchange copper price of 7,950 $/T falling 10% below the 8,811 $/T of 2011. However, sustained high prices, relative to competing materials, continue to present demand and competitiveness challenges for independent smelter/refiners, semi-fabricators, as well as many copper users along the value chain.

It is imperative that the European Commission recognises the serious competitiveness threat posed by the Emissions Trading System. Since metal prices are set on global commodity exchanges, the European industry is not able to pass on additional costs to its customers. While copper producers are now eligible to receive Member State support for indirect emissions, recent attempts to increase the carbon price by the "back-loading" proposal, together with the publication of the carbon market report listing various long-term structural measures, will result in higher carbon costs for European industry. If approved, these initiatives will result in the direct opposite of what the Commission wishes to achieve with its recent objective of increasing industry's GDP contribution, up from the current 16%, to around 20% in 2020.

The copper industry is ready to fully contribute towards achieving this latter target. This will be done through continued product innovation and technological advancements in areas such as energy efficiency, renewable energy, smart grids and the development of hybrid and electric vehicles.

While the industry has invested heavily over many years to reduce the levels of lead in its finished products, it is also very concerned regarding recent proposals to make further dramatic reductions in safe limit values. These will have a serious impact on recycling, since 40-45% of annual EU copper demand is sourced through recycling clean scrap from the downstream value chain, plus end-of-life products, many of which have been in service for over 30 years. It will also be more difficult for the European industry to compete on the global market for the raw materials it needs, since they all contain naturally occurring, background levels of lead.

Finally, I would like to thank the International Copper Association and the European copper industry, plus our many project partners, for their continued funding and support. Also, on behalf of the membership, to thank the European Copper Institute and its European network for their many achievements throughout the past year.

[1] The International Copper Study Group (ICSG) is an inter-governmental organisation, based in Lisbon, which publishes copper production and demand statistics. Visit **www.icsg.org** for more details.

CHIEF EXECUTIVE'S MESSAGE

The benefits provided by the copper industry's products have probably never been as important in meeting the key needs of the world we live in. One of the roles of the European Copper Institute is to raise awareness of these societal benefits to policymakers and regulators, to value chain decision-makers and to the general public. Consider the following three examples:

Firstly, worldwide, according to the World Health Organization, hundreds of million of people per year acquire a healthcare-associated infection. Incidence rates range from 4 to 12% in developed countries. In Europe, 4 million HAIs cause 37,000 deaths and contribute to a further 110,000. The associated costs to society are more than 7 billion €/year. 80% of the bacteria and viruses that cause these infections are spread by touch. Hand washing and cleaning are clearly not enough to address this global issue.

Touch surfaces made out of Antimicrobial Copper Cu+ alloys have been proven, unequivocally, to provide additional protection. Third-party clinical trials have demonstrated that copper alloy surfaces continuously reduce bacterial contamination (e.g. MRSA), and harbour >90% less bacteria than standard surfaces. This has been shown to deliver a 40 to 70% reduction in infection rates in Intensive Care Units.

Secondly, the Food and Agricultural Organisation of the United Nations estimates that nearly 75% of the world's fisheries are already fully exploited or worse. Aquaculture will therefore be required to meet the rapidly growing demand for fish in the human diet. Nearly all of the challenges facing fish farmers are related to the materials they use. Today's synthetic net materials begin to develop biofouling as soon as they are put into the water. This reduces oxygen flow, stressing the fish, and antibiotics are required to combat the infections caused by biofouling.

Nets are susceptible to attacks from predators, such as seals and sharks, and cleaning is expensive and dangerous. At the end of a net's life, usually only a few months, the polluted net, often weighing several tonnes, is landfilled. By using copper alloy mesh, biofouling and predator attacks are essentially eliminated. Tests have shown 20% higher growth rates and lower antibiotic requirements. At the end of their useful lives, typically years, the nets can be 100% recycled.

And thirdly, copper's superior electrical and thermal conductivity requires it to be at the heart of components and systems that generate, distribute and use electricity and energy. Motor systems expend around 65% of the EU industry's electricity consumption. If all motors were replaced with the latest, commercially available models, we could reduce harmful CO_2 emissions by 63 million tonnes/year and save 135 terrawatt hours of electricity (equivalent to the combined demand of Finland plus Greece).

John Schonenberger
Chief Executive
European Copper Institute

Our website, **www.copperalliance.eu**, is regularly updated with content. Whatever your age or position, a mix of electronic press kits, downloadable publications and short, creative YouTube videos will open your eyes to the reasons why copper products are so important to the world we live in.

Partnerships & alliances

By Benoît Dôme, Hans De Keulenaer & Nigel Cotton

Partnerships and alliances play an important role in the success of our activities

Over the years, ECI's capabilities and reputation have enabled us to enter into partnerships with EU and national authorities, the value chain, as well as with academia and the research community.

Apart from the obvious leverage effect, through the combination of know-how and financial means, partnerships add to the credibility of our program messages and open up new outreach channels.

Supporting an international community of practice on electrical energy regulation

A good example of such a partnership is that with the Clean Energy Solutions Center, a global forum founded by the Energy Department of the United Nations. Created in 2011, ECI plays an active role in this community that has the ambition to become a worldwide focal point for knowledge on electrical energy regulation. Ultimately, regulations define investment needs and priorities. One of ECI's objectives is to understand how the copper industry can be best prepared to meet the future needs of this important demand sector.

Helping to provide safe and affordable electricity to the citizens of West Africa

ECI is an active partner of the SEE-WA (Supporting Energy Efficiency for Action in West Africa). This project is supported by the European Commission and managed by ECREEE (ECOWAS Regional Centre for Renewable Energy and Energy Efficiency). SEE-WA developed a report mapping out energy efficiency regulation, actors and stakeholders across the ECOWAS countries, along with a white paper describing best practices. Based on this work, in November 2012, the Ministers of Energy agreed upon groundbreaking, sustainable energy targets for the ECOWAS region.

ECI's core contributions to this project were the provision of technical and regulatory expertise for two papers – one on equipment standards and labelling, the other on improving the efficiency of electricity transmission and distribution.

10 years as a founding member of ESTIF

In 2012, ECI celebrated ten years as a founding member of the European Solar Thermal Industry Federation (ESTIF). Recognised amongst the European Institutions, ESTIF promotes the benefits of solar thermal technologies and renewable heating & cooling solutions. In recent years, market challenges have meant focusing resources on market image, policy development and certification.

ECI's support, in the board of directors and in workshops, helped to position solar thermal solutions, which exploit the high thermal conductivity and durability of copper, as cost-effective, renewable energy-powered providers of hot water. Case studies show that solar thermal can be successfully adopted in both residential and commercial buildings, as well as in large-scale industrial process heat installations. Specifically, in 2012, ECI developed the basis on which solar-powered hot water could be used in the mining sector.

Continued collaboration with the UNDP and UNEP on solar thermal outreach

With the aim of reducing today's use of fossil fuels to heat water, the *"Global Solar Water Heating Market Transformation and Strengthening Initiative"*, funded by the United Nations Development and Environment Programmes, is working closely with the Copper Alliance in implementing the initiative and developing outreach in several countries around the world. In the past year, the project's global knowledge management component has expanded its extensive outreach and is acknowledged as the leading source of information on solar thermal. The global web portal, **Solarthermalworld.org**, facilitates the transfer of information, incentivises the development of the solar thermal industry, and supports local capacity building and the establishment of testing facilities.

In 2012, ECI supported a workshop in Lebanon for government and non-government representatives of the solar industry, to identify opportunities in the Middle East/North Africa region. Subsequent outputs included the new "Solar Heating Arab Mark and Certification Initiative (SHAMCI)".

ECI also participated in several political and industry events including the EUFORES Inter-Parliamentary Meeting in Athens. This event brought together policymakers, renewable industry associations, industry and researchers, active in policymaking and market development, to support the broader uptake of renewable energy and energy efficiency.

About our member companies

Our members include the EU's top six producers of copper, Europe's leading manufacturers of semi-fabricated copper products, such as tube, wire, sheet and strip, plus downstream companies that exploit copper's benefits in end-use applications and innovative technologies.

ECI's members have demonstrated their commitment to reducing the environmental impact of their operations. As one example, its producer members lowered their unit energy consumption by 50% between 1995 and 2006. Information provided to the European Commission, as part of the Emissions Trading System study, also showed that one-third of the energy used to produce today's copper goes into environmental protection measures.

Today, the European copper industry has around 45,000 direct employees. However, millions of other skilled jobs are required to integrate copper products and copper-based solutions into our daily lives. Copper has never been more important for the sustainable growth of modern society. Copper-based products improve the economic efficiency and environmental performance of multiple applications across the energy, healthcare, electronics, industrial, transportation and building sectors.

EUROPEAN MEMBERS

Atlantic Copper · Aurubis · Boliden · Conex Bänninger
Cupori · Diehl Metall · Halcor Metal Works S.A. · KGHM Polska Miedź S.A.
KME The Evolution of Copper · La Farga · Luvata Partnerships beyond metals · Metallo
Montanwerke Brixlegg · Mueller Europe · OM Group · Pegler Yorkshire
Sanha · Sofia Med · Viega · Wieland

ECI'S BOARD OF DIRECTORS

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Werner Traa – WIELAND-WERKE AG

For a full list of members of the International Copper Association, visit **www.copperalliance.org**

Energy & Electricity

by Hans De Keulenaer

Safeguarding EU 2020 targets and supporting the energy transition

The EU has set clear, ambitious targets for 2020 – a 20% reduction in EU greenhouse gas emissions from 1990 levels, raising the share of energy produced from renewable resources to 20% and a 20% improvement in energy efficiency. In 2012, ECI carried out a variety of actions to contribute to their achievement. One of the most important was to develop an energy policy roadmap to identify which areas would benefit most from the superior electrical conductivity of copper products.

Supporting the energy efficiency target

Based on the latest estimates from the Commission, the most challenging of the above targets will be the one on energy efficiency. A key implementation instrument behind this goal is the Directive on the Ecodesign of Energy-Related Products. Throughout 2012, ECI was heavily engaged with Commission experts, providing technical information and benefits scoping on transformers, cable sizing and fractional horsepower motors.

2012 saw the publication of the new EU Energy Efficiency Directive. ECI joined the Sector Forum for Energy Management to support the directive's requirements on energy auditing and energy management. Although much of European industry already performs at world-class efficiency levels, significant energy savings potential remains. ECI developed a financial model that clearly demonstrates the positive, bottom line impact achievable through the implementation of energy efficiency measures.

From an applications and system perspective, we developed an application note showing how automation technology can improve a building's energy performance. Designed to raise awareness amongst architects and designers, the note highlights that, depending on the building's location and design, automation can be at least as effective as thicker insulation. This can be particularly important in renovation and refurbishment.

ECI has also formed a cross-sector technology working group to support the market introduction of new, high efficiency copper rotors for electric motors. These offer a competitive alternate to systems, particularly in hybrid and electric vehicles, that rely on the imports of rare-earth metals.

Increasing the share of renewables

Based on stakeholder interviews, ECI developed a joint initiative to address the challenges the EU faces in meeting its 2020 renewable energy target. During 2012, we organised policy debates on two major 100% renewable scenarios: one from Stanford University, the other from WWF, developed by the Dutch consultancy Ecofys.

As steps towards achieving this 100%, we support longer term (2030/2050) renewables targets for the EU. We believe that European industry can also grow its use of renewable energy. We demonstrated this by developing the concept of coupling industrial processes to wind turbines. For just five processes, this approach would support an additional 70 GW of wind generation capacity within the grid. Managing availability is clearly critical, but one example could be desalination, with periods of excess fresh water being held in a reservoir. To put this capacity in perspective, the European Wind Energy Association estimates that the EU's current wind turbine generation capacity is 105 GW.

We also provided training and educational materials for professionals in the field. Our expanding E-learning Academy, which now has more than 2,000 students, contains 500 hours of online courses. In 2012, we added five courses on scoping and calculating renewable energy projects.

We are also active in improving the functional performance of renewable energy installations. As one example, a recent copper industry innovation, which has helped to lower the production costs of PV panels, has been a new connector ribbon. This consists of an extremely pure type of copper that is rolled flat from a round wire and then coated with tin. Because of their strength, ribbons allow for the production of thinner wafers, with reduced electrical resistance, maximised power output and a far more automated production process.

Reducing greenhouse gas emissions

Energy efficiency and renewable energy, alone, may not be sufficient to meet the EU's 20% emission reduction target. What is required, furthermore, is a shift in end-use applications from fossil fuels to electricity, which will be increasingly generated by renewable sources. One everyday example is the hybrid, or electric, vehicle. A lesser-known technology is the Electrical Processing of Material (EPM). An ECI study demonstrates that a deployment of this technology, e.g. in arc and induction furnaces, could save five billion tonnes of CO_2 emissions in the coming four decades. EPM can also introduce flexibility into the consumption pattern of electricity, which will be increasingly important as the share of renewables goes up.

Adapting the infrastructure to support the targets

The shift towards a more sustainable energy landscape must be supported by crucial infrastructure changes. The standards for European dwellings need to be adapted in order to improve energy performance, integrate electric vehicle charging stations and connect renewable energy systems. Changing demographics and social needs are also impacting the energy needs in our homes and places of work. In the majority of buildings, today's protection, capacity, peak power, and control facilities of electrical installations are insufficient. A robust modernisation program, which is foreseen in the new EU Energy Efficiency Directive, will be crucial for success.

Electrical safety needs to be a priority during renovation. World fire statistics, developed under the initiative of ECI and endorsed by the European Fire Academy, clearly show the link between electrical safety and fire risk. ECI mapped the best practices in regulating electrical safety for residential buildings in a whitepaper that was endorsed by the International Federation for the Safety of Electricity Users (FISUEL).

Transmission and distribution grids also need significant investment to enable a better integration of renewables, to increase the security of supply, through major grid inter-connectors, and to provide straightforward capacity increases in expanding urban environments. ECI is assisting in the development of new transmission line technology to increase the performance of overhead lines.

ECI is also supporting Europacable in its efforts to raise awareness of technologies that allow partial undergrounding of high voltage power cables. Such an approach requires less land usage, reduces visual impact and, through greater public acceptance, can speed up lengthy planning application and permitting processes.

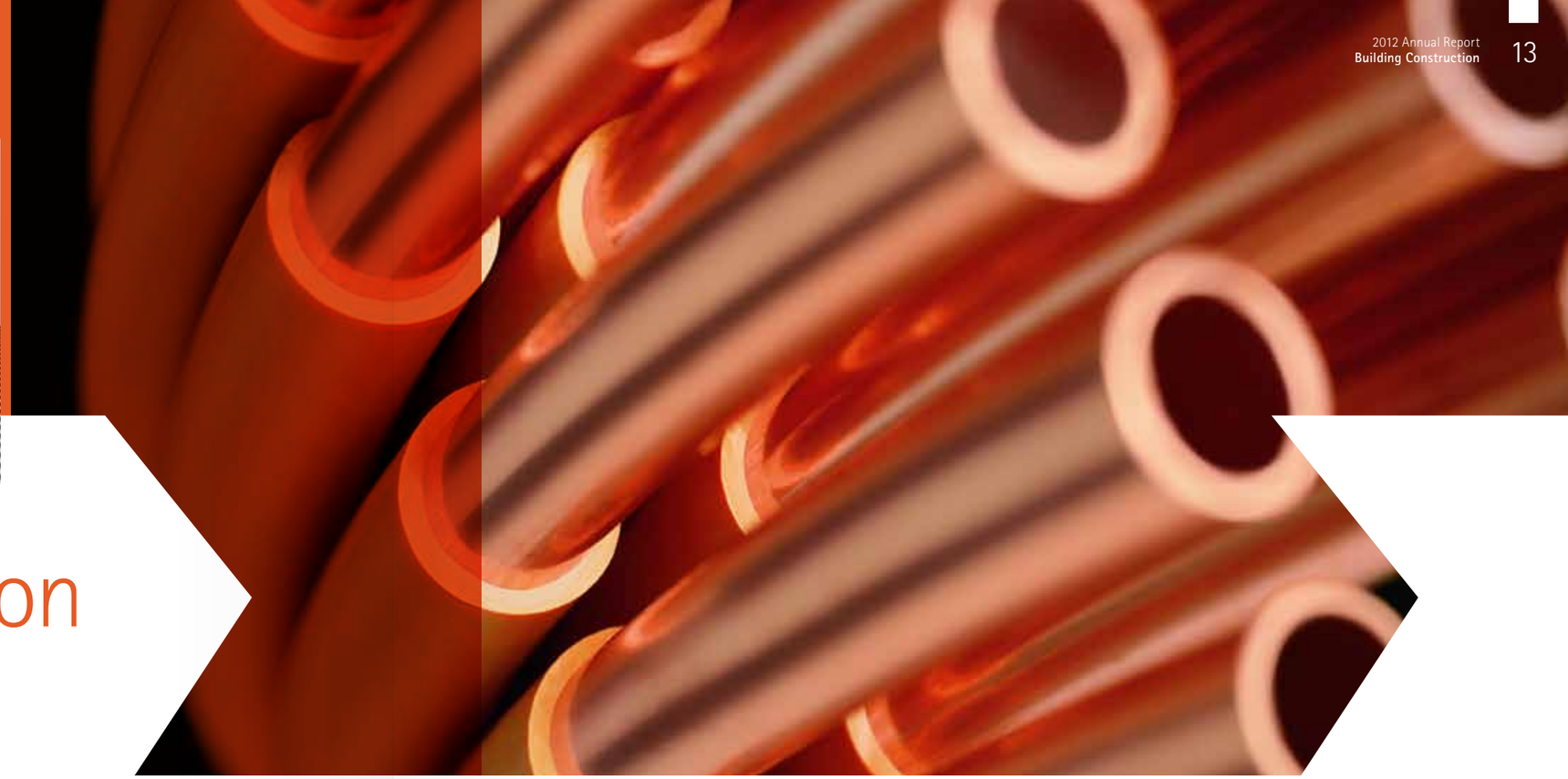
Beyond Europe

Sustainable energy clearly does not stop at the EU's borders. ECI's e-learning programs offer training and education opportunities for the benefit of professionals all over the world. In response to growing interest from developing countries, where professional training is often not widely available, we developed a targeted course on Renewable Energy for Rural Areas.

Throughout 2012, particular attention has been spent on Africa. Our vision of sustainable energy development is coupled to the United Nations mission of delivering safe and affordable access to electricity for all African citizens by 2030. We investigated the possibility to develop electrification projects, supported through a microfinancing system, and developed four whitepapers and an action plan on this topic. On page 8, you can read more about our partnership efforts in the ECOWAS region.

We have also worked with a leading consultant to develop a model that will allow us to carry out a high-level screen of the energy policies of countries neighbouring the EU and benchmark them with those of the EU. This method has identified policy opportunities in two pilot countries: Morocco and Ukraine.

For more info visit **www.leonardo-energy.org**



Building Construction

by Nigel Cotton

Copper as an object of desire may not be your first thought. However, its various uses, within the built environment, are the most visible demonstrations of copper's versatility and sustainability. Whether used in small design elements, or in large design concepts, perceptions of copper have changed in line with modern themes – be it natural, environmentally friendly or futuristic.

Traditional uses have been overtaken by a fresh, exciting display of copper's many attributes – whether it is a dome bursting through a school building, an exterior panel flowing through the wall to be part of the internal design, or a complex external surface transforming a traditional building shape into a soft, curvy iconic landmark.

Copper's durability and flexibility of colour, shape and form give the design conscious endless opportunities to experiment with this timeless material. Throughout 2012, various examples of copper in design have been featured in leading media, including Le Figaro, Daily Mail, Süddeutsche Zeitung and Elle decor.

End-user campaign expanded to the UK

ECI's innovative "Copper in the Built Environment" (CuBE) campaign represents a strong commitment by the copper industry to encourage and support the use of its products across the new build and renovation sectors. The campaign, piloted in Germany (*Mein haus kriegt kupfer*) in 2008, and extended to Italy (*Il rame nobilita la casa*), Poland (*Miec miedz*), France (*Ma maison mérite du cuivre*) and Spain (*El cobre crea Hogar*) in 2011, was launched in the UK in 2012. The "Come Home to Copper" website was completed in time for the campaign's launch at EcoBuild, a major London event attracting upwards of 55,000 visitors each year, most of whom are in the building and construction industry, and many of whom are self-builders.

Directly targeting homeowners and developers, the CuBE campaign explains the benefits that copper-containing products and systems provide in today's homes and buildings. It combines emotionally engaging advertisements and articles in print and online media, national web portals and supporting media relations. In 2012, the campaign benefited from two advertising flights in five countries, generating a total of two hundred million opportunities to view.

In addition, the program influences the use of all non-electrical copper building construction products by providing copper benefit messages to professional decision-makers in material selection (architects, planning engineers, contractors, regulators, future professionals, investors...). European copper product fabricators provide professional guidance and support for the program.

Copper in Architecture

The 32nd and 33rd editions of our flagship biannual Copper Architecture Forum magazine were published in 2012. 25,000 copies in 13 languages were distributed to architects in 16 countries. The host website **www.copperconcept.org**, which received over 80,000 visitors throughout 2012, is all about inspiring Europe's architects by making available a range of aesthetic, technical and regulatory content. 2012 saw increased activity resulting from the revision of the Russian website section, outreach to recognised architectural portals, promotion of the European Copper in Architecture Awards, and production and distribution of the Forum in Russian. With 130 buildings added in 2012, the site now has over 2,500 copper building references.

New App available on www.copperconcept.org

The Hungarian Copper Development Association has developed the first "CopperConcept App" for iPhone, iPad and Android devices. By featuring a regularly updated collection of the best examples of contemporary architecture, using copper and its alloys, we hope it will become a credible reference for designers seeking inspiration in this segment. Reference buildings are illustrated, along with an architectural description and relevant building data. Using a map capability, users can easily locate reference buildings in the city they are in. Also included are the winners, commended and shortlisted buildings of the biennial European Copper in Architecture Awards, as well as online editions of the Copper Architecture Forum magazine.

Copper makes its impact in contemporary design

The travelling "Copper in a box" exhibition was hosted by the French Copper Development Association during the famous annual event, the Designer's Days, in the Museum of Arts and Crafts in Paris in May. This was a symbolic place for copper, due to the theme – history of techniques – and the proximity to the *Arts & Métiers* metro station, which is internally clad with copper. This prestigious CuBE exhibition spot displayed, in 8 coloured boxes, 45 copper and copper alloy objects from designers across the world. The exhibit created a dialogue between the different times and ways of using copper, both as an artistic and an industrial material. The exhibit was displayed by the Italian Copper Development Association for one month at the Triennale Design Museum in Milan, and then at the international fair SAIE in Bologna. New designs are continuously being promoted through the dedicated website **www.copperindesign.org**

French "Prohibition Kit" wins Copper and the Home competition

First prize in the 2012 International Copper and the Home design competition was awarded to Francesco Morackini of France for his project "Prohibition Kit". The jury's unanimous decision was based on the graphical concept of Francesco's design for an alcohol distillery disguised as a collection of everyday objects – a playful reference to the Prohibition Era, when alcohol was banned.

The prize ceremony took place at the Triennale Design Museum in Milan in January 2013, an event organised by the Italian Copper Development Association. In this fourth Copper and the Home competition, designers had been called upon to reinvent everyday objects, celebrating and exploiting the aesthetic and technical strengths of the metal and its alloys. Architects, designers and students of the arts, inspired by copper and its alloys, such as bronze and brass, submitted more than 270 entries in the Professional and Student categories. This is more than triple the number of entries received for the first competition back in 2007.

Thanks to its instantly recognisable beauty and extraordinary versatility, copper offers a wide range of manufacturing possibilities and applications including decorative lighting, vases and mirrors, door furniture, interior decoration and dividing walls, and floors and radiators. In addition to the more commonly known and valued properties, such as electrical and thermal conductivity, malleability, ductility and durability, copper is also antimicrobial, meaning it can significantly reduce bacteria, viruses and fungi on contact. New awareness of this inherent property offers designers an opportunity to enhance hygiene around the home, as well as in public spaces and hospitals, where infections can spread rapidly through touch.

For more information, visit **www.copperconcept.org**

Antimicrobial Copper

by Angela Vessey

Infection control professionals, who are key influencers in the decision to specify antimicrobial copper touch surfaces in healthcare facilities, need evidence-based approaches to support change. While media articles and conference posters can raise awareness, the gold standard for this audience is a peer-reviewed and published scientific paper.

The arguments for the deployment of copper are founded on solid science and the evidence base grew considerably with numerous papers published on the efficacy of copper against multi-resistant bacteria, the role of copper in reducing the spread of these pathogens in healthcare and beyond, and the continuous reduction of bio-burden in the clinical environment. Expert authors have included Professor Keevil, University of Southampton; Professor Schmidt, Medical University of South Carolina; and Professor Elliott, University Hospitals Birmingham NHS Foundation Trust.

The latest evidence — from across the Copper Alliance — has been disseminated widely, to target audiences on both the supply and demand side, to raise awareness, stimulate demand and showcase the increasing availability of products. While healthcare was the main focus throughout 2012, other markets are being developed by reading across the multiple benefits of a more hygienic environment for schools, offices and public buildings.

Growing acceptance by infection control professionals

Outreach to demand side influencers and decision-makers has been centred on more than twenty national and international healthcare events around the region. The Antimicrobial Copper presence usually comprises a scientific symposium, presenting the latest clinical evidence, the exhibition of a range of commercially available components and networking events for key opinion leaders with international copper experts.

Key 2012 participation was at the International Federation of Infection Control in Croatia, the Hospital Infection Society Conference in Liverpool, the 9th National Conference on Public Health and Health Services in Athens, the European Federation of Healthcare Engineers in Norway, the Polish Association of Epidemiology Nurses' Congress, and the Congress of the German Society of Hospital Hygiene.

Exhibition stand visitor surveys show growing buy-in to the copper value proposition with e.g. 68% of respondents at IFIC saying they would recommend Cu+ products for critical locations. This confidence is based on the 40-70% reduction in the risk of catching an infection (data from the clinical trial funded by the USA Department of Defense), and on new models scoping out returns on investment. The growing awareness and acceptance of the antimicrobial copper solution have been reflected in mentions of copper by independent speakers at conferences, peer-to-peer discussions and the publication of a review article, by a leading clinician, in the Journal of Hospital Infection. Many 2012 installations can be traced back to earlier event attendance and post-event follow up.

New cost-benefit model shows payback times of less than one year

The Copper Alliance commissioned the development of a business case model to York Health Economics Consortium, a global leader in healthcare economics. This easy-to-use, customisable model can be used by hospital managers to scope out the return on investment of deploying copper-based solutions. It serves to reassure decision-makers that cost is not a barrier. Early market feedback indicates that this is a convincing and credible model to support the deployment of copper at the time of a new build or planned refurbishment, with paybacks of less than one year shown for Intensive Care Units in the UK.

This new model therefore adds to the array of quality resources available to support the marketing efforts of the supply chain.

Growing product range and increased marketing activity

Outreach to the supply chain has continued across the region at trade shows, workshops and site visits. Events at which we had an important presence included MEDICA, Germany, the world's largest medical equipment show; the International Trade Fair of Medical Equipment and Instruments in Poland; and Hôpital Expo 2012 in France.

To strengthen market visibility, the Copper Alliance has increased the opportunity for semi-fabricated and end-product manufacturers, as well as distributors and solution providers, to sign up to use the Antimicrobial Copper Cu+ brand. The number of Cu+ registered companies now stands at more than sixty, clearly demonstrating market demand for touch surface products such as door furniture, hand rails, toilet fixtures and fittings, trolleys and IV poles. Increasingly more "one stop shops" — able to source and deliver a variety of components — are emerging and leading to a growing number of listings in the online services directory.

We continue to support the supply chain's downstream marketing efforts through the provision of informational and marketing collateral, training webinars and workshops. We have also provided the supply chain with opportunities to promote their goods and services to end users, via co-exhibiting at conferences, through the online and printed Cu+ product directories and by the referral of market enquiries.

Our Polish Copper Development Association coordinated the formation of a twelve-entity partnership that was awarded a one year, $250,000 EU regional funding grant to build a business case that could accelerate the development of a Cu+ supply chain in Poland. Substantial co-funding is available for a successful proposal.

Commercial installations are on the increase

Two of the higher profile installations, attracting significant media coverage, were in the WSSK hospital in Wroclaw, Poland, and in the Rambouillet hospital in France. There were several trial installations in Greek hospitals to demonstrate in-situ efficacy under local conditions. In France, Germany and the UK, supply chain activity secured installations in schools and hospitals, both in the private and public sector. Overall, these demonstrate a clear shift to commercial installations, driven by a combination of raised awareness, the recognition of clear end-user benefits and Copper Alliance-assisted Cu+ partner activity.

In Finland, we've seen a holistic approach to installing Antimicrobial Copper. The Scandinavian CDA is part of the Finnish HYGTECH-project, where an assessment of the microbial populations and loads on touch surfaces, in water distribution systems and in air-conditioning systems, has commenced in three types of buildings.

Hygiene grants

The Copper Alliance provided partial funding to stimulate supply chain marketing activity and installations in non-healthcare markets. The availability of grants was promoted via the trade press and the supply chain and resulted in grants to seven projects. This action served to raise awareness of antimicrobial copper solutions, to engage new partners and to drive an expanded portfolio of diverse installations for future promotion.

Multi-language web resource

The global website is now available in six European languages: English, French, German, Greek, Polish and Spanish. The site, which hosts key scientific references, concise information, news, events and products and service directories, supports both the demand and supply sides. Through a combination of the new language sections, organic growth and a Google advertising campaign, the site received 69,000 visits and 196,000 page views, representing a 3-fold increase on 2011.

Media relations bring benefit messages to the general public

With developments taking place on many fronts, there has been a wealth of material to sustain a high-quality media outreach campaign. Drawing on regional and international developments, more than thirty press releases covered a range of topics, including new research findings, installations, Cu+ sign-ups, new products, novel applications and events. Numerous articles were requested by both the general and the trade press. As a result, there were well in excess of 200 million "Opportunities to See" across Europe throughout the year.

For more information, visit **www.antimicrobialcopper.org**

Technical market support

by Anton Klassert and Angela Vessey

The second most important application of copper, accounting for 1.5 million tonnes, or around one-third of annual European demand, is the production of a wide variety of alloys. The incorporation of other metallic elements, sometimes at the < 0.1% level, allows the industry to tailor its offerings to specific end-use sectors. The primary performance attributes improved by alloying include strength, colour, machinability, corrosion and wear resistance.

The Copper Development Association in the UK (CDA) and the Deutsches Kupferinstitut (DKI) in Germany have served as experts to the value chain for almost nine decades. They supply commercially neutral technical advice, which helps professionals choose the most suitable material for their latest innovation.

Starting as a pilot in Germany several years ago, the range of technical support has been expanded to better serve downstream, copper-using companies. 2012 saw a steep increase in these new activities, including commercial technical seminars and engineering services, workshops, symposia and research projects – the latter mostly funded by German State Agencies. As momentum builds, we expect that the DKI will expand this service to cover other parts of Europe.

Updating our technical publications to meet market needs

In 2012, we focused our pro-active UK technical support on marine, offshore renewables and antimicrobial applications and, in Germany, on automotive, general engineering and renewables. New publications, along with updates of existing materials, included one on marine applications for young engineers in the UK, and one on micro-alloyed copper in Germany. Significant effort was also spent on prioritising existing website content in preparation for a new, pan-European technical website, which will provide a comprehensive inventory of material and applications information and interactive online tools in both English and German by the end of 2013.

7,000 technical enquiries answered

Amongst the year's key achievements was an increase in visitors to our main websites, with more than a half a million evenly distributed between the UK and Germany. Most came from key industrial global players, their supply chains and major research institutes. Excluding support for plumbing systems, which is offered in the national language by all eleven Copper Development Associations, we responded to more than 7,000 technical enquiries.

Commercial engineering service projects – within the DKI pilot – grew to more than twenty, doubling the 2011 revenue; and the number of participation-fee based seminars increased from two to five. Two copper research projects – fully funded by German Federal State Authorities, worth €300 K each in 2012 and 2013 – were initiated. Further projects were submitted for funding in 2014 and beyond.

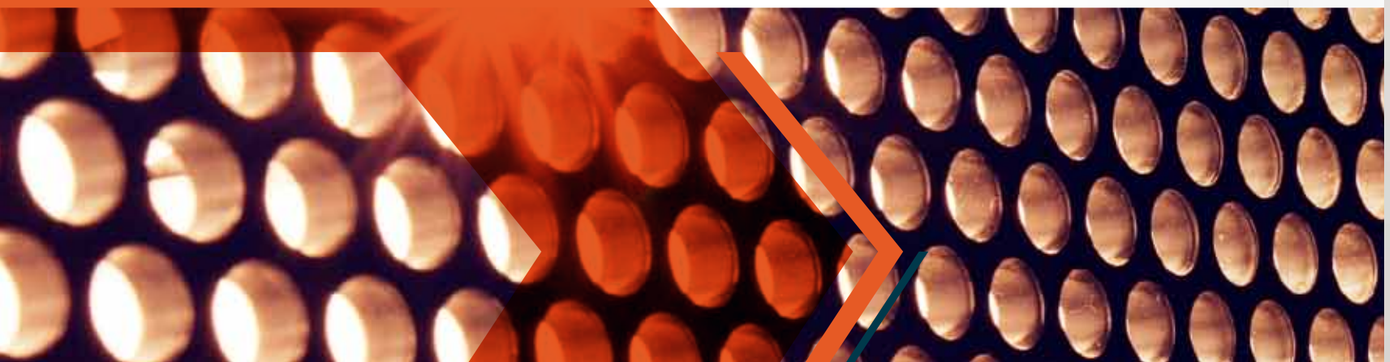
The bilingual – English and German – Copper Key has been expanded. This online, global tool allows an industrial company which uses a particular alloy, under one national standard, to easily find an alloy that meets the equivalent standard in another national market.

Supporting the marine sector

The Metra Martech Marketing Report, on the marine applications of copper-nickels, identified a gap in the copper alloy knowledge of new marine engineers. Pre-empting this finding, the CDA held several workshops for industrial companies, marine engineers and university students, and co-authored a book for engineers, on how to use alloys to best advantage in marine environments.

In addition to improving knowledge of copper alloy benefits, the CDA engaged in active outreach to facilitate technology transfer to new sectors, including offshore renewables. With industry support, it exhibited at key events, such as Seawork International. It also provided a keynote speech at the French Corrosion Institute's Marine Renewables Conference, strongly positioning CDA as a credible source of technical and practical information in this growing field.

For more information, visit **www.kupferinstitut.de** and **www.copperalliance.org.uk**



Technology and Innovation

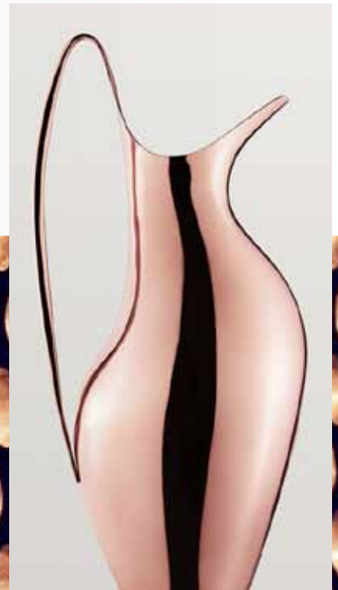
by Nigel Cotton and Nick Vergopoulos

MicroGroove delivers resource efficiency to the air-con sector

MicroGroove™ is a global umbrella brand covering the marketing of smaller diameter copper tubes into the room air conditioning, commercial and refrigeration sectors. Their benefits include smaller size, lighter weight, lower material cost, higher heat transfer coefficients and more cost-effective fabrication and assembly.

We presented at major industry events in the USA, China and Europe, and achieved a significant presence in major international magazines and online portals. In addition, a number of technical papers were presented at technical conferences and our fabricator members reinforced the campaign by co-promoting at fairs and seminars. Online, the **www.microgroove.net** website hosted two global technical webinars.

During 2012, we positioned MicroGroove as suitable for use with R290 (Propane) and R744 (CO_2), two natural refrigerants which are considered less damaging, and supported by a number of global brands for use in their Reach-in display cases. Using smaller size copper tubes also means using less refrigerant charge, which lowers both cost and the environmental footprint.



Several challenges and opportunities shape today's air conditioning market

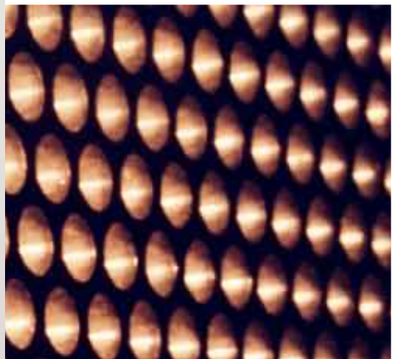
Air conditioning consumes a sizeable, and growing, amount of electricity. Therefore energy efficiency, along with changing the energy mix, is of high interest. At the same time, the air-con industry acknowledges the changing role that the commercial and refrigeration industry must play, to sustain a growing and aging population, and to deliver cold chain systems and display units with reduced environmental impacts.

Following up on the International Copper Association's technology work on the antimicrobial properties of copper, links were highlighted in our MicroGroove Update publication to the all-copper heat exchanger. Using interesting case studies, this combines copper's antimicrobial properties, which deliver improved indoor air quality, with higher energy efficiency performance.

Later in the year, we started to explore the opportunities for MicroGroove in refrigeration and food transportation units. We gathered intelligence on the key drivers, such as the environmental footprint of systems, efforts to find HCFC and HFC alternatives, the use of solar and waste heat-driven systems, and the software requirements to model coil performance.

While the introduction of smaller diameter copper tubes into the commercial and refrigeration markets actually reduces copper demand, this is a clear example of an innovation that combines higher performance and resource efficiency.

For more information, visit **www.microgroove.net**



Can copper alloy cages deliver a breakthrough in the aquaculture sector?

According to the United Nations Food and Agriculture Organisation (FAO), nearly 75% of the world's fisheries are fully exploited, or worse. Open-water fishing is unable to meet the growing demand for fish in the human diet and nearly all of the challenges facing fish farmers are related to the materials used. As part of a worldwide effort, to explore how aquaculture cages produced out of copper and copper alloys are able to address these challenges, a trial project was launched in Greece.

A new copper net was prepared to compare its strength and antifouling properties against nylon, the typical synthetic material in use. After ten months, the results show that the copper mesh has excellent structural integrity and significantly less fouling. This fouling reduces the mesh size thereby lowering the rates of water renewal and oxygen replenishment. It can also host harmful parasites, a typical solution to which is the use of antibiotics.

Other primary advantages of the copper mesh are its ability to withstand predator (seal and shark) attacks and, at the end of its eventual life, it can be 100% recycled, whereas heavily fouled synthetic nets add to the burden of landfills.

The copper wire, used to produce the mesh, is being tested for its corrosion resistance at the site in Crete, under the coordination of the Greek Copper Development Association and the Institute of Aquaculture of the Hellenic Centre for Marine Research.

This exciting innovation connects copper and the copper industry to the societal issue of food supply.

For more information, visit **www.aquaculture.org**

Health, Environment and Sustainable Development

by Katrien Delbeke and Katia Lacasse

Assessing the long term environmental profile of copper

The conclusions from the EU Copper Voluntary Risk Assessment (2008)[2] and the copper REACH dossier (2012) demonstrate that the existing legislative framework generally safeguards man and the environment. As an essential nutrient, copper contributes to the development of humans and is a well-recognised essential element for all life forms. In fact, broader research indicates that deficiency in humans, farm animals and agricultural soils is a bigger issue than copper excess.

ECI's HESD program continues to pro-actively assess and demonstrate the safe production, use and transport of copper and copper-containing materials. Differences in copper release rates, plus changes in speciation and bioavailability, are key to understanding, and then managing, the resulting balance between essentiality and toxicity.

In 2012, we focused on compliance with the EU substance (REACH and Classification & Labelling), industrial emission (Integrated Pollution, Prevention and Control) and product (Ecolabels) regulations. At a global level, ECI coordinated the industry's preparations under the UN's GHS and International Maritime Organization's MARPOL Annex V classifications.

Our activities illustrate a shift away from the assessment of "pure" copper towards those of complex, metal-containing materials (e.g. concentrates, intermediates and alloys). While this raises the importance of multi-metal stakeholder interactions, it is also critical to assessing the long term environmental profile of copper, as well as understanding copper's value as an important enabler of a more sustainable society.

ECHA strengthens REACH compliance and introduces targeted checks on specific concerns

With REACH moving into the implementation phase, new guidance from the European Chemicals Agency (ECHA), on Strictly Controlled Conditions for Intermediates, required changes to our approach for the by-products of the smelting and refining processes. Full registrations, along with comprehensive Chemical Safety Assessments, are being prepared for members whose operations do not comply with these new conditions. Assessing the hazards and risks of these complex, multi-metal containing substances, so called UVCBs, is extremely challenging. Approaches, which avoid animal testing, have been harmonised across the various non-ferrous metal Consortia. Under the leadership of Eurometaux, acceptance building efforts are ongoing with ECHA.

New guidance required revisions to classification and labelling

In final preparation for ECHA debates on a harmonised classification for copper and copper compounds used as biocides, ECI's REACH Consortium submitted an updated effects section of the copper dossier. This includes distinct and revised classification proposals for coated copper flakes (also used as biocides), copper powders and copper in massive forms.

The update is aligned with the 2012 revision to the EU CLP (Classification, Labelling and Packaging) Directive which introduced the chronic (long-term) environmental toxicity endpoint, in order to be compliant with the 3rd version of the UN's Global Harmonized System on Classification and Labelling. Both schemes include an assessment of "rapid degradation". Substances that do not exhibit such a property require more stringent classification. For metals and inorganic metal compounds, the rapid and irreversible removal from the water column has been proposed as an equivalent to the rapid degradation concept used for organics.

While the rapid removal concept was recognised during the 2012 ECHA workshop, further guidance, plus a demonstration of experience, were required to enhance its relevance and acceptability. A follow-up, multi-metal research project, recently submitted to ECHA and the Member State authorities, concluded that, under environmentally relevant conditions, copper ions are "rapidly removed from the water-column and the potential for re-mobilisation is very small".

ECI assisted global industry in complying with new IMO guidelines

The International Maritime Organization (IMO – MARPOL Annex V) published new criteria regarding the classification of bulk cargoes. From 1st January 2013, residues, or wash water containing residues, of cargoes that are classified as "Hazardous to the Marine Environment" can no longer be discharged into the sea, but must be treated at adequate port reception facilities.

To support the global copper industry in meeting its obligations, ECI completed a comprehensive assessment of copper concentrates. Mineral and elemental composition analyses, plus methodologies and science used for earlier chemicals management purposes, were used to determine human health and environmental hazard classifications. The approach avoided the need for additional animal testing by applying read-across methodologies developed under REACH. So far, 117 different copper concentrates have been analysed and consolidated into an excel-based model for individual company use. While several concentrates merit environmental classification under the UN GHS and EU guidelines, only a few require classification under MARPOL Annex V.

New standards secure Ecolabels and support market access for copper alloys

Based on over fifteen years of industry research and testing, a broad range of copper alloys has been proven to be suitable for use in products in contact with drinking water and are contained in the four Member States positive list. This initiative was recognised in the "Commission Decision establishing the ecological criteria for the award of the EU Ecolabel for sanitary tapware". Inclusion in this positive list will enable copper and the listed copper alloys to apply for this ecolabel.

Commission enables industry support under the Emissions Trading System

The European copper industry welcomed its presence on the short list of sectors that are eligible to receive Member State aid under the 2013 revision to the Emissions Trading System. This is fully consistent with a 2010 Commission decision that the EU copper sector is exposed to a significant risk of carbon leakage. After a year of extensive advocacy, coordinated by ECI and Eurometaux, the Commission recognised that, due to the copper price being set on global commodity exchanges, the copper sector cannot pass on higher indirect emission costs to its customers. Rather than being subject to an industry-wide benchmark, the entire EU copper sector will be treated under the "fall back" option. However, it remains up to each Member State to decide on the actual level of financial compensation for its national industry.

ECI coordinated industry input into revision of the non-ferrous metal BREF document

The European Bureau for Integrated Pollution Prevention and Control (IPPCB) re-launched the process to update the non-ferrous metal Best Available Techniques REFerence (NFM BREF). This comprehensive reference document is used as the basis for local plant permits across the EU. Industry volunteered to re-draft the copper chapter, the vast majority of which was accepted. Expert review by the Member States and IPPC bureau is expected to be finalised in mid-2013.

Industry provided revised life cycle data for copper products

A major update of ECI's Life Cycle Assessment data provided additional insights into the sustainability of the copper products placed on the EU market. The 'cradle-to-gate' study, coordinated by the industry's global Life Cycle Centre, based in the German Copper Institute, incorporates industry data covering 90% of the EU's 3.8 million tonne copper market.

The study starts with the extraction of naturally occurring ores, continues through the production of copper metal (cathode), incorporates the positive impact of recycling and finishes with the manufacture of semi-finished goods, such as wire, sheet and tube. In 2011, a record high 44.8% of EU copper demand was sourced through recycling a combination of offcuts from the value chain and end-of-life products. ECI's study finds that although first stage ore extraction and processing are the main impact contributors, these are usually set by the mineralogy of naturally occurring ore deposits and the sources of local electricity available to process them.

Ensuring sufficient copper is available to meet society's future needs will require both increased levels of recovery and recycling and substantial investments in primary production.

For more information, visit **www.copperalliance.eu**

[2] http://echa.europa.eu/web/guest/information-on-chemicals/transitional-measures/voluntary-risk-assessment-reports

Communications are at the heart of our activities

by Irina Dumitrescu

Always on the look-out for new, beneficial innovations for customers, designers are turning to copper to transform and perfect the most familiar of objects. Even though copper was the first metal worked by humans, new uses are still being found to exploit the red metal's inherent attributes — conductivity, malleability, recyclability, antimicrobial efficacy and even style.

Copper products are the basis for many innovations that impact daily life.
In cars, its strength and recyclability have made it the star exterior material for the latest Peugeot concept car, introduced at the Paris Motor Show. Its inherent antimicrobial properties reduce the risk of spreading infection by frequent touch, such as on door handles, stair rails, pens and computer keyboards.

Our communications efforts seek to meet the needs of many audiences. These range from explaining copper's benefits in well-established applications, as you can read on pages 10 to 19, to stirring curiosity to learn more about the red metal, to build trust in it and to understand why it remains essential to the new technologies that will meet societal needs and improve our individual lives.

The power of the new Copper Alliance identity

ECI quickly embraced the new brand and identity of the Copper Alliance. Around the world, the copper industry funds a network of associations whose common mission is to defend and grow markets for copper, based on its superior technical performance and its contribution to a higher quality of life. Early in 2012, this network of global, regional and national associations has been unified under a common brand and identity — the Copper Alliance. This will unify and strengthen our public image, make us a more attractive project partner and improve the effectiveness of our promotional, regulatory and technical outreach activities in over sixty national markets worldwide.

I work with copper...

Although it plays a crucial role in modern society, most copper applications are not visible. A new video, featuring the many jobs that depend directly on copper, was published on ECI's YouTube account. Targeting the public at large, media, students and the EU institutions, the video features the many different professionals who work with copper, every day, and outlines why they consider it to be one of the key materials for their work. Copper has been used since ancient times and, as society and technology continue to progress, new professions will no doubt also benefit from this highly versatile material.

Maintaining an open dialogue with EU stakeholders

ECI's 'Copper Wire' electronic newsletter is distributed to EU regulators and decision-makers. The spring edition highlighted the publication of the new Life Cycle Assessment for copper products (see page 19). To better understand the downstream benefits of making this type of data available, ECI interviewed Philips Consumer Lifestyle, a company that places great emphasis on reducing energy and material consumption during the design phase. *"We would like to thank the copper industry for their great efforts in calculating the Life Cycle Analyses of their products and we hope that it will continue to study and publicise the environmental impacts of its products. The copper industry has set a great example and we hope that many other industries will follow"*, explained Eelco Smit, Sustainability Manager.

The summer issue focused on copper's role in electrical safety. We took a closer look at the importance and impact of electrical safety, both in Europe and beyond. Many residential installations do not meet current design standards and are under-sized for the requirements placed on them. This has led to many instances of electrical fires with extensive property damage and loss of life. Anne Rialhe, Director of AERE (Alternatives pour l'énergie, les énergies renouvelables et l'environnement) and Edgar Blaustein, expert on energy, associated with AERE for the West Africa project, outlined some of the efforts underway to improve the situation.

We provide tailored information to multiple audiences

Whether it is to raise awareness within the public at large, build credible media relations, deliver positive messages to decision-makers, or support our industry members, ECI's communications activities and channels are at the core of our work. You can find much more information at:

www.copperalliance.eu
general information on copper, the industry and ECI's key activities

www.leonardo-energy.org
global community for sustainable energy professionals

www.antimicrobialcopper.org
ultimate resource on the latest science, worldwide applications and product availability

www.copperconcept.org
inspiring architects on copper's sustainable contributions to the building construction market

www.solarthermalworld.org
global knowledge on solar thermal energy

www.copperindesign.org
global community of designers using copper as a material of choice

www.essentialforeveryone.eu
key advocacy messages targeting European stakeholders and the general public

www.microgroove.net
supporting the use of economical and eco-friendly small diameter microgroove tubes in air conditioning and refrigeration

www.copperalliance.org
information on our global network

We are also increasing our use of social media, e.g. nurturing LinkedIn groups and growing our series of YouTube channels.

LinkedIn YouTube

Facts & Figures

By Catherine Mantell

Throughout 2012, ECI and its network of eleven national Copper Development Associations operated with an industry provided budget of $17.3 M (€12.5 M) to develop and carry out promotional and regulatory affairs activities across the region.

In addition, European resources within the Copper Alliance managed a $1.0 M budget for projects targeted at impacting the global demand for copper.

The International Copper Association, representing the world's leading mining companies, independent smelter/refiners and semi-fabricators, provided 80% of the annual industry budget.

Over 100 partners, both academic institutions and industrial companies, continue to provide strong support for ECI's Leonardo ENERGY program, which broadly promotes the sustainable generation, distribution and use of electrical energy.

2012 was the fifth year in which our efforts benefited from a grant from the United Nations Global Environment Fund.

The GEF awarded $12 M to the ICA, over a five-year period, to promote the use of solar thermal energy technologies in six countries around the world (Albania, Algeria, Chile, India, Lebanon and Mexico).

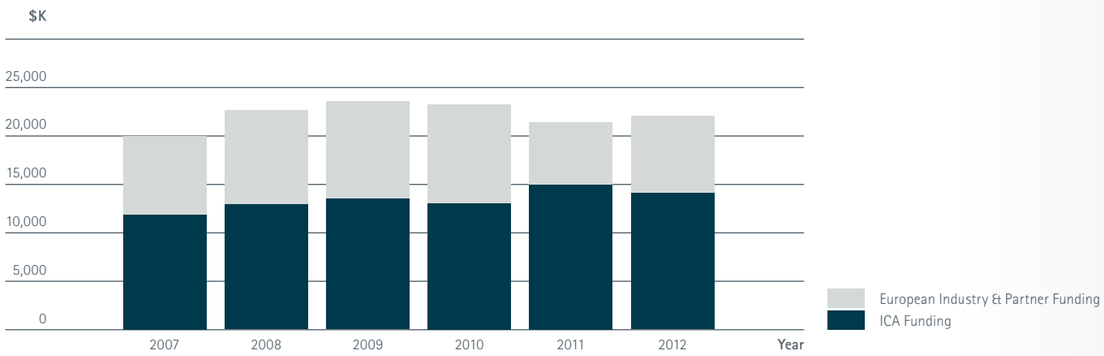
Other key projects, supported by significant funding from partners outside the industry, were:

- A partnership with the Economic Community of West African States, worth $0.9 M/year from 2012 through 2014, to support the setting of technical standards and advocacy on energy efficiency;
- The second, worth $3 M/year for 2012 through 2014, with the Clean Energy Solutions Centre, a joint initiative of the United Nations and the Clean Energy Ministerial, to promote policies and programs that encourage the transition to a global clean energy economy;
- And, the third, worth $0.7 M/year with FISUEL, the International Federation for the Safety of Electricity Users, to raise awareness of the positive impacts that mandatory inspections of residential electrical installations have on reducing fires, deaths and injuries.

2012 Funds ($K)

Strategic Initiative	ICA Funding	European Industry & Partner Funding	Total
Building Construction	$4,300	$1,800	$6,100
Electricity & Energy	$4,000	$4,700	$8,700
Technology & Innovation	$1,400	$300	$1,700
Antimicrobial Copper	$1,400	$300	$1,700
Health, Environment & Sustainable Development	$800	$500	$1,300
Communications	$1,400	$200	$1,600
Administration	$1,400	$500	$1,900
Total Funds	**$14,700**	**$8,300**	**$23,000**

European Promotion Funds (2007–2012)



Access the Copper Alliance

ECI is a member of the Copper Alliance, an international network of trade associations, whose common mission is to work with their respective members to defend and grow markets for copper, based on its superior technical performance and contributions to a higher quality of life.

In Europe, ECI works with a network of eleven national associations, some of which have over 80 years' experience in promoting and defending the many uses of copper. The value of our services to our members, and to the market, is built on the skills, expertise and cultural diversity of our people. Throughout our offices, we employ a mix of over fifty professionals from many different disciplines.

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